(54) Title: METHOD AND SYSTEM FOR DISPLAYING DIGITAL BILLBOARDS
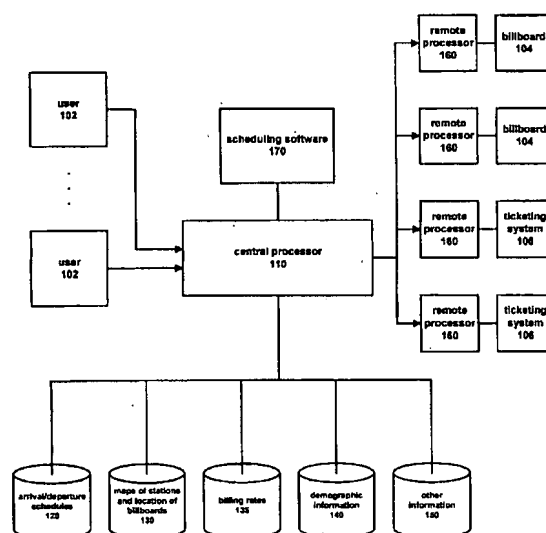
(57) Abstract: A central scheduling program transmits and runs messages, such as advertisements and public announcements, at
particular billboards located in an airport (104), for example, based on flexible audience targeting schedule rules or algorithms, which
may include flight departure and arrival times (120), billboard location (130), location attributes and characteristics, audience demo-
graphics for certain airports and flights (140), and other relevant information (150). This program may also apply to bus stations,
train stations, and other transportation stations, as well. A network of digital billboards provides the ability to target messages, such
as advertisements and public announcements, to a targeted audience. The digital format further enables advertisements to change
and be updated periodically (170).

METHOD AND SYSTEM FOR DISPLAYING DIGITAL BILLBOARDS

Field of Invention

The present invention relates to a network of digital billboards for displaying messages, such as advertisements, in strategic locations, such as designated terminals at airports, to coincide with the arrival, presence, and departure of specific targeted audiences.

Background of the Invention

An important aspect of effective advertisement is having an audience view an advertisement or message that is important to that audience. For example, college students are generally not interested in baby formula and diapers. Women shoppers will rarely give a second glance to advertisements targeting football fans. Likewise, apartment renters are not the ideal target for lawn care products. Advertisements for a specific audience that are displayed to the general public lose their effectiveness if not viewed by the intended audience.

Most advertisements are displayed for a continuous duration of a few weeks or months depending on the type of product. The ability to target advertisements, such as billboards or signs that are displayed in public-areas, to a targeted audience most interested in the product or service being advertised is limited. The advertisements are viewed by everyone who happens to travel through the area displaying the advertisement, whether it is on a subway, a bus stop, a roadside, or inside an arena or mall. Because it is difficult to estimate what type of potential customers will be passing through a particular area, it is difficult to target advertisements accordingly. In other words, it is hard to coincide the display of a specific advertisement to the presence or viewing time of the intended audience.

However, it is possible to forecast arrival and departure times of individuals who travel on airplanes, trains, buses, or other modes of transportation, or participate in other scheduled and ticketed events. For example, airplane flight data provides arrival and departure times into a particular city and gate at a particular time. Real-

time flight data is readily available through the FAA and other third party providers. With the appropriate data, advertisers and marketers may strategically display messages or advertisements for a designated period of time based on passenger arrival or departure time, passenger demographics, availability of products for a particular

5   city, or other relevant information. Therefore, a method and system for targeting messages or advertisements based on the arrival time, departure time, and the demographics of targeted audiences as well as product, service or information attributes is desired for a more effective response to the messages or advertisements displayed.

10   These and other drawbacks exist with current methods and systems of "out-of-home" advertising.

Summary of the Invention

An object according to the present invention is to overcome these and other drawbacks with existing systems.

15   It is an object of the present invention to display a message, such as an advertisement and other public announcements in public places, where the displaying of the message coincides with the arrival, presence, and departure of specific targeted audiences.

It is another object of the present invention to use demographic information

20   from passengers to display a targeted advertisement at one or more arrival and/or departure terminals.

It is another object of the present invention to use flight schedules, airline data or other audience event data including other ticketed event data to display a targeted message, such as an advertisement, in airports or other public facilities.

25   Other objects and advantages of the present invention will be apparent to one of ordinary skill in the art upon reviewing the specification herein.

A central scheduling software transmits and runs messages, such as advertisements and other public announcements, at particular billboards located in an airport, for example, based on flexible audience targeting scheduling rules or algorithms, which may include flight departure and arrival times, billboard locations, location attributes and characteristics, audience demographics for certain airports and flights, and other relevant information. This central scheduling software may also be applied to bus stations, train stations, other transportation stations, and public arena or facilities where the arrival and departure of a specific target audience is scheduled or ticketed as well.

The scheduling software may utilize linear programming algorithms as well as other rules-based finite scheduling algorithms to determine optimal scheduling and placement of each message at each billboard location. The central scheduling software may communicate with a remote processor at each billboard location in real-time utilizing the Internet. The central scheduling software may dynamically adjust the message schedule in response to changes in flight schedules or other data indicating a change in the expected arrival and departure of the targeted audience. The central scheduling software may then transmit these adjustments to the remote message processor at each billboard location.

A network of digital billboards provides the ability to target messages, such as advertisements and public announcements. The digital video display format enables advertisements to change across time thereby enabling an expansion in the number of messages displayed and audience-message occurrences.

Brief Description of the Drawings

FIG. 1 is a diagram of a system for enabling one or more users to display messages based on a scheduling algorithm according to an embodiment of the present invention.

FIG. 2 is a diagram illustrating the options available on a central processor according to an embodiment of the present invention.

Detailed Description of the Preferred Embodiments

      The invention relates to a network of digital billboards for displaying messages in transportation stations, such as airports, bus stations, train stations, or other public facilities and locations where passenger or audience arrival and departure times may

5   be scheduled, ticketed, or predicted. A central scheduling software transmits and runs messages, such as advertisements or public announcements, at each unique, strategically placed billboard based on a number of flexible audience targeting scheduling rules or algorithms. These scheduling rules or algorithms allow users to target an audience by optimizing the placement and duration of messages in response

10   to real-time changes in audience data. These factors may include arrival and departure times, billboard location including location attributes and characteristics, audience demographics for particular airports and certain flights, trips or audiences, and other information.

      For example, advertisements in airports according to this system may target a

15   particular audience based on real-time flight schedule data. Thus, advertisements for Disneyworld may be scheduled to correspond to the waiting or boarding period at departure gates of airports around the world for flights departing for Orlando, Florida. In another example, car rental companies may dynamically price and promote certain vehicles at departure gates for inbound flights to locations where an oversupply of that

20   particular vehicle class exists. Advertisements may be strategically placed and timed to appear to the most appropriate segment of people, depending on their destination or arrival locations and flight times. In addition, the present invention may also use passenger or audience demographic information to target messages, such as advertisements and public information, to this audience. For example, a flight

25   carrying mostly businessmen may be targeted for advertisements of electronic equipment used to organize and maintain a busy executive's contacts and schedule. Public interest groups may also use the system to display informative advertisements regarding safety in certain areas. Also, missing children posters may be posted at arrival or departure terminals at cities where the child was last seen, for example. City

30   representatives may also use the system to promote certain tourist sites for incoming out-of-town visitors.

FIG. 1 illustrates a system for displaying targeted messages, such as advertisements and other public information, according to an embodiment of the present invention. One or more users 102 may access the system through a network, such as the Internet or other methods of establishing network communication. A user

5   may include a service merchant, a product merchant, an information provider, a service provider who sells advertising on the proposed network of billboards, or other user that may desire to post a public message. Central processor 110 may be connected to several databases storing relevant information. Database 120 may store information regarding audience arrival and/or departure schedules. In the case of

10   airports, database 120 may store flight schedules and airlines, for example. This information may be made available through the FAA or other sources of flight data. Database 130 may store information regarding maps of transportation stations, such as airports, train stations, bus stations, sports arenas, or other public facilities where audience events are scheduled or ticketed. Database 130 may also store the location

15   of billboards, arrival terminals, and departure terminals. Database 135 may store billing rates for each billboard location and time period. Advertising rates for each intersection of time and billboard location stored in database 135 may be used to supply revenue data to a scheduling algorithm. Database 140 may store demographic information of passengers or audiences. Such demographic information may relate to

20   particular flights and airports, or particular scheduled audience events such as hockey games or rock concerts taking place in other public arenas or facilities. Database 150 may store other relevant information for targeting an audience.

A designated message, such as an advertisement, may then be transmitted to and posted on strategically placed billboards 104, pursuant to the user's specifications.

25   In a preferred embodiment, the billboard may include a gas plasma "flat TV" display panel. The billboard may incorporate a built-in thin-client processor and a high resolution graphics and video output processor. This remote processor may run network client operating system software. A user may connect to central processor 110 that schedules and transmits packets of advertising messages and related run-time

30   applications to one or more of these billboards 104 on a periodic basis. These packets

may consist of software applets and the related message content or data and graphics or video files for each message.

Central processor 110 may transmit and run advertising messages at each unique billboard location based on a number of flexible audience targeting scheduling rules or algorithms. These scheduling rules or algorithms may allow the use of any combination of factors to be specified in determining the placement for any given advertising message, such as time, billboard location or location attributes and characteristics, audience demographics for certain airports/flights, events and time slices, and other relevant information. The targeted advertisement may be based on real-time arrival and departure data. For example, real-time schedule data for airplane flights are publicly accessible either directly from the FAA, or through other third parties.

The scheduling software 170 may utilize linear programming algorithms as well as other rules-based finite scheduling algorithms to determine the optimal scheduling and placement of each message at each billboard location. These scheduling algorithms may enable the system to maximize the utilization, revenue and profit from the available display time across all the billboards in the network. Scheduling software 170 may use the billing rates store in database 135 to determine scheduled message placement in order to maximize realized billable revenue from the available display times and locations across the network of display devices. The central scheduling software may communicate with a remote processor 160 at each billboard location in real-time utilizing the Internet. The central scheduling software may dynamically adjust the message schedule in response to changes in flight schedules or expected arrival and departure of the targeted audience. The central scheduling software may then transmit these adjustments to remote message processors 160 at each location.

In another embodiment of the invention, the central processor may communicate with one or more ticketing systems 106 associated with an airline, train, other transportation station or other location where audience events may be ticketed, to transmit a message to be printed at the ticketing system. This feature may be used

in conjunction with the digital billboard display feature. Advertising messages and other messages may be printed on passenger or audience tickets, itineraries, ticket jackets, and other associated paperwork. According to the invention, these advertising messages and other messages may be printed in real-time at a passenger or audience

5   check-in and ticketing system. For example, real-time messages may be printed on each ticket, for each passenger or event participant, to correspond with an advertising message that has been displayed at a gate or arrival and departure area for the flight, train, bus, or other event that is being ticketed. In this example, the passenger may view an advertisement for rental cars on a billboard and also receive a coupon for a

10   discount on the same car rental company printed on the back of the ticket stub or itinerary. A user may specify a message to be printed on all tickets for a given flight, a given passenger, a given city, or other criteria.

In another example, printed coupons may include frequent flyer miles. This may be established by an agreement between the ticketing center and the issuing

15   merchant. Such an agreement may be executed by printing a barcode on the coupon that contains the passengers frequent flyer account number which may be scanned by the issuing merchant. Such a procedure may allow the carrier and merchants on the network to establish a joint relationship with the consumer which would stimulate consumer loyalty by rewarding the consumer for their utilization of the joint

20   arrangement or partnership.

FIG. 2 illustrates the details of central processor 110 according to an embodiment of the present invention. At input module 210, the user may input specifications regarding the type of audience the user may desire to target. Such information may include the location of billboards, such as a specific airport, bus

25   station, train station, arena, or a city of choice, at module 212; a duration of time, at module 214; demographic information, at module 216; and other factors, at module 218. In addition, location information may also include location of ticketing systems, at module 212.

Central processor 110 may then display the possibilities available to the user in

30   response to user inputs, at display results module 220. Central processor 110 may

also display the optimal or several optimal or recommended scheduling solutions of a queue of requested messages according to the results of linear programming or rules-based finite scheduling algorithms. User may then select and invoke the desired schedule at module 250. Module 220 may display arrival times, at module 222; departure times, at module 223; times available for display, at module 224; location information such as city and/or transportation station, at module 225; gate and/or terminal or facility information, at module 226; and other relevant information, at module 227. For example, Disneyland may request airports with incoming flights to Orlando, Florida. Advertisements regarding Disneyland may be posted at the departure gates at designated airports at various cities for incoming flights to Disneyland. The user may program these advertisements to run for an hour before boarding time, for example.

The user may also input the desired location or placement of a message at a designated transportation station or facility, at location/placement module 230. The system may provide the user with a map 232 of a selected facility, such as an airport, bus station, or train station. The user may select one or more display methods, such as billboards 234 and ticketing stations 236, for the display or print out of a message.

At message & graphics module 240, the user may enter or transfer appropriate information regarding the message, advertisement, or slogan to be displayed at one or more billboards 104 or printed out at one or more ticketing systems 106. The information may also include graphics, pictures, animation or full-motion video. In addition, messages, such as coupons, may be printed out at ticketing stations 106.

At set schedule module 250, the user may select a schedule for display or printout. For example, the user may only desire the message to be displayed one hour before a flight departure and one hour after a flight arrival. Various other schedules are available to the user. For example, a user may sponsor a scrolling ticker across the bottom of a screen in all locations. This display may be programmed to coincide with departure and arrival times of flights in general, as opposed to selected flights. In another example, a local restaurant in Richmond, Virginia may affordably buy 30

minutes a day of exposure at a local airport as opposed to having to pay a high cost for a whole billboard dedicated to the restaurant.

The user may schedule the display of a message according to specific audience event arrival and departure times, at module 260. For example, the user may request advertisement to be displayed at billboards corresponding to specific airlines and flight destinations. For example, a computer company may broadcast a welcome advertisement at departure airports and arrival airports for attendees of a technology conference in Seattle, Washington. In another example, a clothing company may broadcast a advertisement for jeans at a concert attended by college students.

Module 270 maintains a record of a user's account and fees. Other services, at module 280 are also available to the user.

Other embodiments and uses of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. The specification and examples should be considered exemplary only.

Claims

What is claimed is:

1.   A method for displaying one or more messages on one or more digital billboards comprising the steps of:

5   enabling a user to input specifications for targeting the one or more messages to an audience;

providing one or more messages for display where each message is displayed at a billboard location; and

displaying the one or more messages at a designated period of time in
10   accordance with a scheduling algorithm wherein the scheduling algorithm utilizes linear programming or other rules-based finite scheduling logic that determines optimal scheduling and placement of each message at each billboard location.

2.   The method of claim 1 wherein the scheduling algorithm includes passenger or audience departure times.

15   3.   The method of claim 1 wherein the scheduling algorithm includes passenger or audience arrival times.

4.   The method of claim 1 wherein the scheduling algorithm includes billboard location attributes.

5.   The method of claim 1 wherein the scheduling algorithm includes billable
20   advertising rates for each intersection of time and billboard location and determines scheduled message placement to maximize realized billable revenue from the available display times and locations across the network of display devices.

6.   The method of claim 1 wherein the scheduling algorithm includes passenger or audience demographics.

7.   The method of claim 6 wherein passenger or audience demographics include demographics for facilities in which data regarding scheduled or ticketed audience events are available.

8.   The method of claim 1 wherein the one or more messages includes
5   advertisements.

9.   The method of claim 1 wherein the scheduling and display of messages at remote billboards are dynamically adjustable in real-time in response to changes in expected audience arrival and departure times and locations based on changes in flight, other transportation schedule data, or other schedule or ticketing data regarding
10   audience events at the relevant display locations.

10.   The method of claim 1 wherein said changes in message schedule are communicated from a central processor to a remote processor connected to the display device utilizing the Internet as the communication network between the central processor and the remote processor.

15   11.   The method of claim 1 wherein the billboard display utilizes high resolution video display devices which provide the ability to display multiple static or video images that change through time.

12.   The method of claim 1 further comprising the step of providing one or more ticketing messages for printout at one or more ticketing systems wherein the ticketing
20   message is printed on the ticket or paperwork associated with a ticket at the time of ticketing.

13.   The method of claim 12 wherein printed ticketing message corresponds with displayed billboard messages targeted for that flight, trip or other audience event at the ticketing location.

25   14.   A system for displaying one or more messages on one or more digital billboards comprising:

an input module for enabling a user to input specifications for targeting the one or more messages to a specific audience;

a message module for providing one or more messages for display where each message is displayed at a billboard location; and

a schedule module for displaying the one or more messages at a designated time in accordance with a scheduling algorithm wherein the scheduling algorithm utilizes linear programming or other rules-based finite scheduling logic that determines optimal scheduling and placement of each message at each billboard location.

15. The system of claim 14 wherein the scheduling algorithm includes passenger or audience departure times.

16. The system of claim 14 wherein the scheduling algorithm includes passenger or audience arrival times.

17. The system of claim 14 wherein the scheduling algorithm includes billboard location attributes.

18. The system of claim 14 wherein the scheduling algorithm includes billable advertising rates for each intersection of time and billboard location and determines scheduled message placement to maximize realized billable revenue from the available display times and locations across the network of display devices.

19. The system of claim 14 wherein the scheduling algorithm includes passenger or audience demographics.

20. The system of claim 19 wherein passenger demographics include demographics for facilities in which data regarding scheduled audience events are available.

21. The system of claim 14 wherein the one or more messages includes advertisements.

- 13 -

22. The system of claim 14 wherein the scheduling and display of messages at remote billboards are dynamically adjustable in real-time in response to changes in expected audience arrival and departure times and locations based on changes in flight, other transportation schedule data, or other data regarding audience events at
5 the relevant display locations.

23. The system of claim 14 wherein said changes in message schedule are communicated from a central processor to a remote processor connected to the display device utilizing the Internet as the communication network between the central processor and the remote processor.

10 24. The system of claim 14 wherein the billboard display utilizes high resolution video display devices which provide the ability to display multiple static or video images that can change through time.

25. The system of claim 14 further comprising a ticketing system module for providing one or more ticketing messages for printout at one or more ticketing
15 systems wherein the ticketing message is displayed on tickets or paperwork associated with a ticket.

26. The system of claim 14 wherein the message printed on ticket or ticket paperwork is printed at the time of ticketing to correspond with concurrent messages displayed on billboards at the ticketing location, gate or platform.
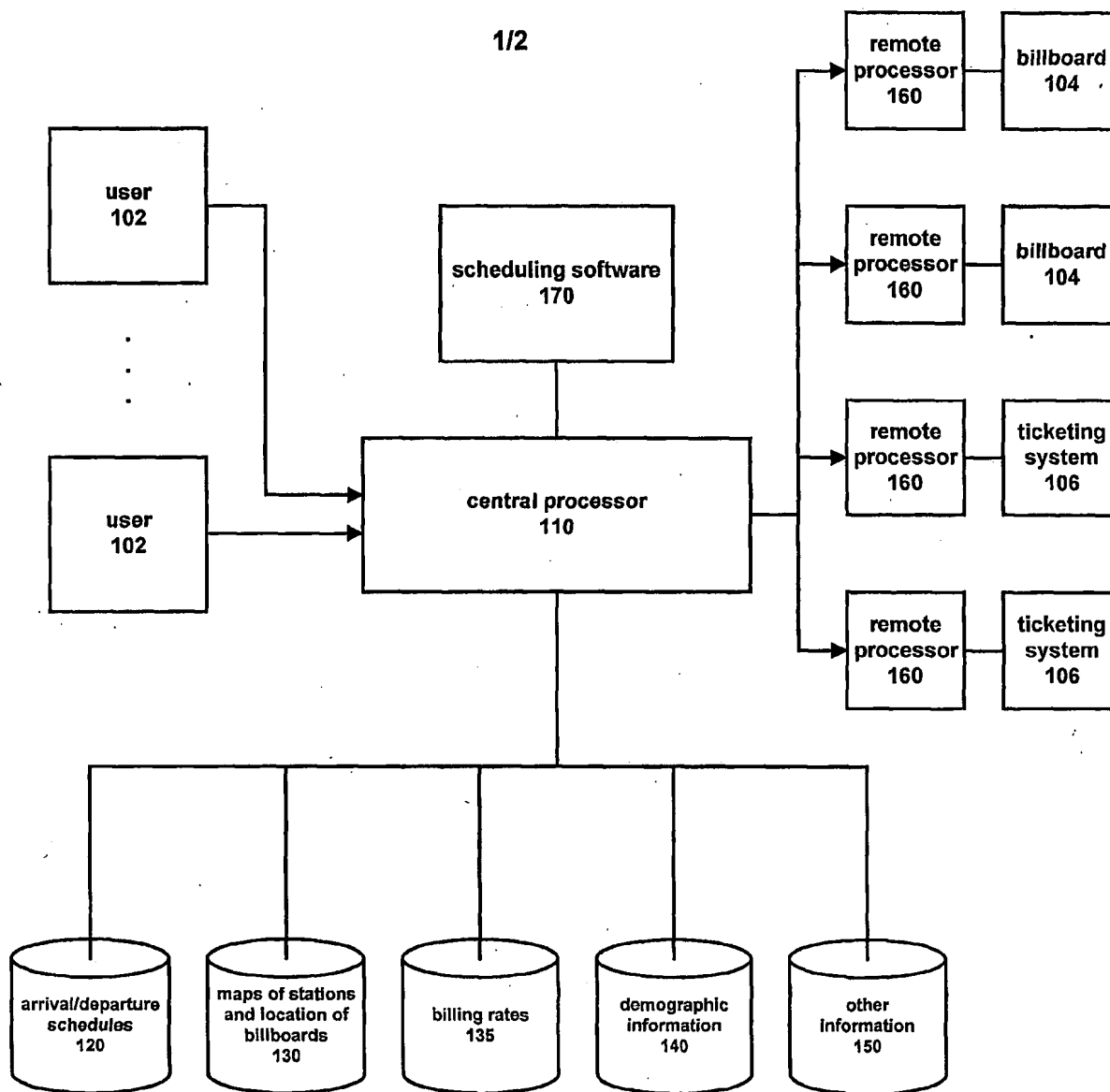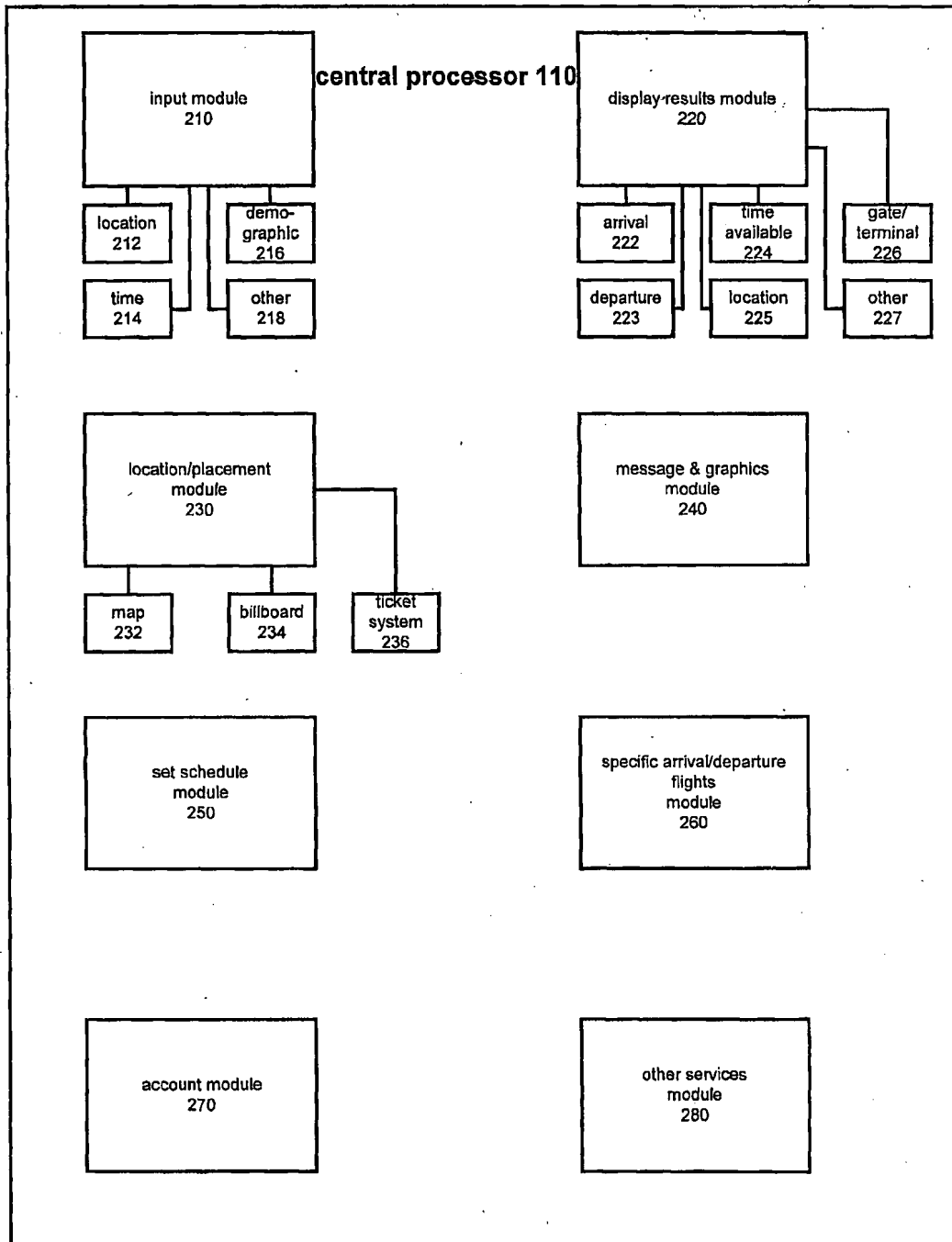
20

1/2

FIG. 1

2/2

FIG. 2

INTERNATIONAL SEARCH REPORT

	International application No.
	PCT/US01/03070

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) :G06F 17/60
US CL : 705/14
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/14, 5

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST
SEARCH TERMS: DISPLAY, BILLBOARD, FLIGHT SCHEDULE, ADVERTISEMENT, PROMOTION.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, P	US 6,119,098 A (GUYOT ET AL.) 12 SEPTEMBER 2000, WHOLE DOCUMENT	1-26
A	US 5,937,392 A (ALBERTS) 10 AUGUST 1999, WHOLE DOCUMENT	1-26
A	US 5,946,646 A (SCHENA ET AL.) 31 AUGUST 1999, WHOLE DOCUMENT.	1-26
A	US 5,948,061 A (MERRIMAN ET AL.) 07 SEPTEMBER 1999, WHOLE DOCUMENT.	1-26
A	US 5,923,252 A (SIZER ET AL.) 13 JULY 1999, WHOLE DOCUMENT	1-26
A	US 5,809,481 A (BARON ET AL.) 15 SEPTEMBER 1998, WHOLE DOCUMENT.	1-26

☒	Further documents are listed in the continuation of Box C.	☐	See patent family annex.

	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance		
"E"	earlier document published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 APRIL 2001	09 MAY 2001

Name and mailing address of the ISA/US	Authorized officer
Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	ERIC STAMBER
Facsimile No. (703) 305-3230	Telephone No. (703) 305-8000

Form PCT/ISA/210 (second sheet) (July 1998) *

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT.

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,959,717 A (CHAUM) 28 SEPTEMBER 1999, WHOLE DOCUMENT	1-26
A	US 6,014,698 A (GRIFFITHS) 11 JANUARY 2000, WHOLE DOCUMENT.	1-26
A,P	US 6,141,010 A (HOYLE) 31 OCTOBER 2000, WHOLE DOCUMENT.	1-26